UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,455	05/19/2005	Gaeil Ahn	122991-05062663	9734

22429 7590 03/13/2009

LOWE HAUPTMAN HAM & BERNER, LLP
1700 DIAGONAL ROAD
SUITE 300
ALEXANDRIA, VA 22314

EXAMINER	
GELAGAY, SHEWAYE	

ART UNIT	PAPER NUMBER
2437	

MAIL DATE	DELIVERY MODE
03/13/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/535,455	AHN ET AL.	
	Examiner	Art Unit	
	SHEWAYE GELAGAY	2437	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 May 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/19/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to the original application filed on 5/19/05.

2. Claims 1-15 are pending.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

4. The Information Disclosure Statement (IDS) submitted on 5/19/05 has been considered (see attached PTO 1449).

Oath/Declaration

5. The Oath filed on 5/19/05 complies with all the requirements set forth in MPEP 602 and therefore is accepted.

Drawings

6. The drawings were received on 5/19/05. These drawings are accepted.

Specification

7. The specification filed on 5/19/05 is accepted.

Claim Objections

8. Claims 1 and 7 are objected to because of the following informalities: Claims 1 and 7 recite "STT" in abbreviated form, STT needs to be spelled out. Appropriate correction is required.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1-2 and 5-8 are rejected under 35 U.S.C. 102 (e) as being anticipated by Moran et al. (hereinafter Moran) 7,299,277.

As per claim 1:

Moran teaches an apparatus connected between a network access unit and a network to be protected, for protecting legitimate traffic from DoS and DDoS attacks, comprising:

a high-priority queue; (*figure 40; col. 46, lines 55-58; a high priority queue*)

a low-priority queue; (*figure 40; col. 46, lines 55-58; a low priority queue*)

a queue information table having specific STT service queue information of a specific packet; (*col. 27, lines 15-17; a priority filter table (CAM), which contains information to the priority flows e.g. address pairs, etc.*)

a queue coordinator for updating the queue information table based on a load of a provided STT and a load of the high-priority queue; (*col. 27, lines 61-67; the flow processor to give a set of priority to a set of flows that contain a provisional (or other) address pairs corresponding to packets of interest*)

a packet classifier for receiving a packet from the network access unit, investigating an STT service queue of the received packet from the queue information table, selectively transferring the received packet to the high-priority queue or the low-priority queue in accordance with an investigation result (*col. 46, lines 53-57; the flows are prioritized into high and low priority flows. High priority flows are stored in high-priority queue while low priority flows are stored in low-priority queues*) and providing information on the received packet to the queue coordinator; (*col. 45, line 32- col. 46, line 56; Flow Classification Engine…the Flow Classification engine writes back L3 or other addresses for selected flows to the CAM priority flow*); and

a buffer for buffering outputs of the high-priority queue and the low-priority queue and providing buffered outputs to the network to be protected. (*col. 2, line 15; flow processor filters and buffers the collected data; col. 30, lines 30-32; the buffer space for each queue varies dynamically based on the arrival of classified packet; col. 46, lines 61-62; buffers from low-priority queue can be reallocated to the high-priority queue*)

As per claim 2:

Moran teaches all the subject matter as discussed above. In addition, Moran further discloses wherein the network to be protected comprises a server. (*col. 4, lines*

36; server)

As per claim 5:

Moran teaches all the subject matter as discussed above. In addition, Moran further discloses wherein a maximum load of the high-priority queue and the low-priority queue is set to be a maximum allowable load of the network to be protected. (*col. 46, lines 61-62; buffers from low-priority queue can be reallocated to the high-priority queue*)

As per claim 6:

Moran teaches all the subject matter as discussed above. In addition, Moran further discloses wherein the network to be protected comprises a server. (*col. 4, lines 36; server*)

As per claim 7:

Moran teaches a method for protecting legitimate traffic from DoS and DDoS attacks in an apparatus therefor, wherein the apparatus is connected between a network access unit and a network to be protected and includes a queue information table having specific STT service queue information of a specific packet, a queue coordinator for updating the queue information table based on a load of a provided STT and a load of a high-priority queue and a packet classifier for receiving a packet from the network access unit, investigating an STT service queue of a received packet from the queue information table, selectively transferring the received packet to the high-priority queue or the low-priority queue in accordance with an investigation result and

providing information on the received packet to the queue coordinator, the method comprising the steps of:

(a) obtaining an STT ID based on a source IP address of the packet received from the network access unit; (*col. 27, lines 15-17; a priority filter table (CAM), which contains information to the priority flows e.g. address pairs, etc; col. 73, lines 26-28; only packets that match a specific set of MAC addresses (source or destination) may be included. Additionally, only packets that include a specific VLAN Group can be included*)

(b) investigating a service queue corresponding to the searched STT ID from the queue information table and checking whether the service queue is the high-priority queue or the low-priority queue; (*figure 40; col. 46, lines 55-58; a low priority queue*)

(c) transferring the received packet to the high-priority queue if the service queue is the high-priority queue in the step (b); (*figure 40; col. 46, lines 55-58; a high priority queue*)

(d) transferring the received packet to the low-priority queue if the service queue is the low-priority queue in the step (b); (*col. 46, lines 53-57; the flows are prioritized into high and low priority flows. High priority flows are stored in high-priority queue while low priority flows are stored in low-priority queues*) and

(e) transferring the received packet information to the queue coordinator. (*col. 27, lines 61-67; the flow processor to give a set of priority to a set of flows that contain a provisional (or other) address pairs corresponding to packets of interest*)

As per claim 8:

Moran teaches all the subject matter as discussed above. In addition, Moran further discloses wherein the network to be protected comprises a server. (*col. 4, lines 36; server*)

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moran et al. (hereinafter Moran) 7,299,277 in view of Bremler-Barr et al. (hereinafter Bremler-Barr) US 2003/0076848.

As per claim 3:

Moran teaches all the subject matter as discussed above. In addition, Moran further discloses wherein the information on the received packet includes a packet size and an index of the queue information table for representing STT information of the packet (*col. 27, lines 15-17; a priority filter table (CAM), which contains information to the priority flows e.g. address pairs, etc.*). Moran does not explicitly disclose information includes a packet arrival time. Bremler-Barr in analogous art, however, discloses information includes a packet arrival time (*page 5, paragraph [101]; arrival times of the packet*). Therefore it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the system disclosed by Moran with Bremler-Barr in

order to determine the next packet service completion time (paragraph [101]; Bremler-Barr).

13. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moran et al. (hereinafter Moran) 7,299,277 in view of Dobson US 6,650,643.

As per claim 4:

Moran teaches all the subject matter as discussed above. In addition, Moran teaches wherein the queue information table has fields including an STT ID, a service queue *col. 27, lines 15-17; a priority filter table (CAM), which contains information to the priority flows e.g. address pairs, etc; col. 73, lines 26-28; only packets that match a specific set of MAC addresses (source or destination) may be included. Additionally, only packets that include a specific VLAN Group can be included*). Moran does not explicitly disclose wherein the queue information table has an average load, a recent load calculation time and a total packet size. Dobson in analogous art, however, discloses wherein the queue information table has an average load, a recent load calculation time and a total packet size (*col. 6, lines 17-31; after calculating the current load, the load integrator calculates the average load at a pre-defined interval*). Therefore it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the system disclosed by Moran with Dobson in order to calculate current load and an average load for the processor based on the result from the load calculator performing the load calculator task (col. 4, lines 36-37; Dobson).

14. Claims 9-11 and 13-15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moran et al. (hereinafter Moran) 7,299,277 in view of Dobson US 6,650,643.

As per claim 9:

Moran teaches all the subject matter as discussed above. In addition, Moran further discloses (a') calculating an average load of an STT corresponding to the packet information transferred from the packet classifier; (*col. 30, lines 30-67; to manage aggregate packet rate and avoid dropped packets, the expert task monitors the average depth of the priority queue and may selectively discard flows from the priority filter*) (b') resetting an STT service queue based on the calculated average load of the STT; (*col. 30, lines 30-67; the buffer space for each queue varies dynamically based on the arrival of a classified packet that meet the priority criteria and as the number of flows increases, buffers are reallocated . To manage aggregate packet rate and avoid dropped packets, the expert task monitors the average depth of the priority queue and may selectively discard flows from the priority filter*) (c') calculating an average load of the high-priority queue; (*col. 46, lines 60-62; Buffers from both the high and low priority queue can be reallocated if the amount of data surpasses a predetermined threshold.*) Moran does not explicitly disclose resetting a certain STT service queue based on the calculated average load of the high priority queue; and storing the reset STT information in the queue information table. Dobson in analogous art, however, discloses (d') resetting a certain STT service queue based on the calculated average load of the high-priority queue; (*col. 8, lines 57-64; the load integrator issues a re-start instruction to the load calculator in order to determine the next current load*) and (e') storing the reset STT information in the queue information table. (*col. 8, lines 61-64; the load integrator may calculate and store a current load and an average load for the processor*) Therefore it

would have been obvious to one ordinary skill in the art at the time the invention was made to modify the system disclosed by Moran with Dobson in order to calculate current load and an average load for the processor based on the result from the load calculator performing the load calculator task (col. 4, lines 36-37; Dobson).

As per claim 10:

The combination of Moran and Dobson teaches all the subject matter as discussed above. In addition, Dobson further discloses wherein the modified STT information refers to a modified average load and service queue. (*col. 8, lines 61-64; the load integrator may calculate and store a current load and an average load for the processor*)

As per claim 11:

The combination of Moran and Dobson teaches all the subject matter as discussed above. In addition, Dobson further discloses wherein the step (a') further includes the steps of: (a'1) calculating a total packet size based on the packet information transferred from the packet classifier; (*col. 6, lines 17-31; after calculating the current load, the load integrator calculates the average load at a pre-defined interval*) (a'2) checking whether it is time to recalculate an average load; (*col. 6, lines 17-31; after calculating the current load, the load integrator calculates the average load at a pre-defined interval*) (a'3) calculating a new average load by using a previous average load and a current average load based on the total packet size if it is time to recalculate the average load in the step (a'2); (*col. 8, lines 50-64; the load integrator discards the oldest prior load and stores the current load, ...the load calculator*

calculates the average load) and (a'4) performing an STT service queue determination algorithm based on the load of the STT if it is not time to recalculate the average load or subsequent to executing the step (a'3). (*col. 8, lines 57-64; the load integrator issues a re-start instruction to the load calculator in order to determine the next current load*)

As per claim 13:

The combination of Moran and Dobson teaches all the subject matter as discussed above. In addition, Moran further discloses wherein the step (b') further includes the steps of: (b'1) setting an STT service queue of a received packet to be a the low-priority queue if an STT load of the received packet is greater than an allowable load when the high-priority queue is in a congested state; (*col. 48, lines 5-8; as the priority queue water-level approaches a " minimum head room" threshold, flows are randomly discarded from priority set a, relegating them back to non-priority queue*) (b'2) randomly choosing one STT using a low-priority queue from the queue information table if the service queue of the STT corresponding to the received packet is a high-priority queue; (*col. 48, lines 8-9; During this time, the flow processor may only service the priority queue)* (b'3) setting an STT service queue of a low load to be a high-priority queue and an STT service queue of a high load to be a low-priority queue if an average load of an STT corresponding to the received packet is greater than that of the randomly chosen STT; (*col. 30, lines 30-67; to manage aggregate packet rate and avoid dropped packets, the expert task monitors the average depth of the priority queue and may selectively discard flows from the priority filter*) (b'4) randomly choosing one STT using a high-priority queue from the queue information table if the service queue of the

STT corresponding to the received packet is a low-priority queue; (*col. 30, lines 30-67; to manage aggregate packet rate and avoid dropped packets, the expert task monitors the average depth of the priority queue and may selectively discard flows from the priority filter*) and (b'5) setting an STT service queue of a low load to be a high-priority queue and the STT service queue of a high load to be a low-priority queue if an average load of an STT corresponding to the received packet is smaller than that of the randomly chosen STT. (*col. 30, lines 30-32; the buffer space for each queue varies dynamically based on the arrival of classified packet; col. 46, lines 61-62; buffers from low-priority queue can be reallocated to the high-priority queue*)

As per claim 14:

The combination of Moran and Dobson teaches all the subject matter as discussed above. In addition, Dobson further discloses wherein the step (c') further includes the steps of: (c'1) determining an STT service queue based on a load of an STT; *(col. 6, lines 17-31; after calculating the current load, the load integrator calculates the average load at a pre-defined interval)* (c'2) calculating a total packet size served through a high-priority queue if the service queue used by the received packet is a high-priority queue; *(col. 6, lines 17-31; after calculating the current load, the load integrator calculates the average load at a pre-defined interval)* (c'3) calculating an average load of a high-priority queue if it is time to recalculate a load; *(col. 8, lines 50-64; the load integrator discards the oldest prior load and stores the current load, ...the load calculator calculates the average load)* (c'4) resetting a certain STT service queue based on the load of the high-priority queue; and (c'5) storing modified STT information in the queue

information table. *(col. 8, lines 57-64; the load integrator issues a re-start instruction to the load calculator in order to determine the next current load)*

As per claim 15:

The combination of Moran and Dobson teaches all the subject matter as discussed above. In addition, Moran further discloses wherein the step (d') includes the steps of: (d'1) calculating an average load of a high-priority queue; (*col. 48, lines 5-8; as the priority queue water-level approaches a " minimum head room" threshold, flows are randomly discarded from priority set a, relegating them back to non-priority queue*) (d'2) randomly choosing one STT using a high-priority queue and setting a queue of the STT to low-priority if the load of the high-priority queue is in a congested state; (*col. 48, lines 8-9; During this time, the flow processor may only service the priority queue)* (d'3) randomly choosing one STT using a low-priority queue and setting a queue of the STT to high-priority if the load of the high-priority queue is in an idle state; (*col. 30, lines 30-67; to manage aggregate packet rate and avoid dropped packets, the expert task monitors the average depth of the priority queue and may selectively discard flows from the priority filter*) and (d'4) storing modified STT information in the queue information table if the load of the high-priority queue is in a stable state or the steps of (d'2) and (d'3) are performed. *(col. 2, line 15; flow processor filters and buffers the collected data; col. 30, lines 30-32; the buffer space for each queue varies dynamically based on the arrival of classified packet; col. 46, lines 61-62; buffers from low-priority queue can be reallocated to the high-priority queue)*

15. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moran et al. (hereinafter Moran) 7,299,277 in view of Dobson US 6,650,643 and in view of Bremler-Barr et al. (hereinafter Bremler-Barr) US 2003/0076848.

As per claim 12:

The combination of Moran and Dobson teaches all the subject matter as discussed above. In addition, Moran further discloses wherein the packet information includes a packet size and a queue information table index and a corresponding STT. (*col. 27, lines 15-17; a priority filter table (CAM), which contains information to the priority flows e.g. address pairs, etc.*). Both references do not explicitly disclose information includes a packet arrival time. Bremler-Barr in analogous art, however, discloses information includes a packet arrival time (*page 5, pp. 101; arrival times of the packet*). Therefore it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the system disclosed by Moran and Dobson with Bremler-Barr in order to determine the next packet service completion time (paragraph [101]; Bremler-Barr).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SHEWAYE GELAGAY whose telephone number is (571)272-4219. The examiner can normally be reached on 8:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Emmanuel Moise can be reached on 571-272-3865. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. G./
Examiner, Art Unit 2437

/Emmanuel L. Moise/
Supervisory Patent Examiner, Art Unit 2437